SMITH-CORONA®
DOT MATRIX PRINTERS

D-200™

POWER
ON LINE
LINE FEED
FORM FEED

D-300™

OPERATOR'S MANUAL

IMPORTANT INFORMATION

The following information is provided to you in accordance with the rules and regulations of the United States Federal Communications Commission Questions concerning this information can be directed to Smith-Corona by writing or calling:

Smith-Corona
SCM Corporation
3695 Erie Boulevard East
DeWitt. New York 13214
Toll-free number 1-800-448-1018
N Y Toll-free number 1-800-962-3000

This equipment generates and uses radio frequency energy. If it is not installed and used properly. that is. in strict accordance with the manufacturer's instructions: it may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules. which are designed to provide reasonable protection against such interference in a residential installation. However. there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception. which can be determined by turning the equipment off and on. the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate the computer with respect to the receiver
- move the computer away from the receiver
- plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary. the user should consult the dealer or an experienced radio/television technicanfor additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful. **How to Identify and Resolve Radio-TV Interference Problems.** This booklet is available from the United States Government Printing Office. Washington. DC 20402. Stock No. 004-000-00345-4.

Warning: This equipment has been certified to comply with the limits for a Class B computing device. pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices. terminals. printers. etc.) that are certified to comply with the Class B limits may be attached to this computer Operation with non-certified peripherals or unshielded interface cables is likely to result in interference to radio and TV reception.

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1 INTRODUCTION

Your Smith-Corona printer is a high-density dot-matrix printer which can perform a variety of different printing operations. It can print:

- Proportional spaced characters.
- Standard characters (Normal, Condensed and Elite).
- Near Letter Quality characters.
- Italic characters.
- Graphic characters.

For word processing, you'll find the printer's Proportional spaced characters (created on a variable 17 x 18 dot-matrix) can produce near letter-quality results.

If, however, you need a print-out that is produced faster, Standard characters (created on a 9 x 9 dot-matrix) are just the thing for you!

You can use the graphic data capabilities to draw just about any type of graphic configuration you desire.

Control Code Sets: Your printer is equipped with two sets of control codes. For most applications, the Standard set will be just what you need. If however, you wish to use the IBM® control set, just flip a switch and it will be available to you and includes both IBM® character sets with IBM® graphics.

You can use three types of paper with the printer:

- Standard computer fanfold forms with guide holes. The printer can also print one original and up to two carbon-copies. D200 accommodates 4" - 11" wide paper. D300 accommodates 4" - 15" wide paper.
- Standard single-sheet typewriter paper.
- The D200 accommodates as an option roll-paper, 8½" wide with a 1" core and a maximum diameter of 5". See your Smith-Corona dealer for further details.

Software-controlled features include:

- Bi-directional logic-seeking carriage motion. (Uni-directional in Graphic Mode, NLQ Mode and Super/Subscript Mode.)
- 2K input buffer.
- Underline capability.
- Downloadable Character capability
- Paper empty sensor automatically stops the printer so you can replenish the paper.
- Parallel and Serial Interfaces.

and much more!

2 SPECIFICATIONS

DIMENSIONS

PRINTER	**D200**	**D300**
Height:	128 mm	163 mm
Width:	420 mm	630 mm
Depth:	340 mm	360 mm
Weight:	8.5 kg	18 kg

OPERATION:	**D200**	**D300**
Print Method:	Impact Dot Matrix	
Print Speed Standard High Speed:	160 cps at 10 cpi	
Printing Direction:	Bi-directional Printing with Standard Characters Uni-directional Printing in NLQ, Pin Graphic and Super/Subscript	
Logic Seeking:	Available in all Print Modes	
Paper Slew Speed:	1.1 ips	2.7 ips
Single Line Advance:	160 ms	80ms

CHARACTER STRUCTURE
CHARACTER MODE:

	D200	D300
Character Font:	10 x 9 Emphasized 9 x 9 Standard 10 x 9 Elongate 9 x 9 Italic 9 x 9 Super/Subscript 17 x 18 NLQ Print Head has 9 pins. No. 9 pin to be used for underline and decenter character	
Character Set:	Normal Quality 96 ASCII 11 x 8 International Characters NLQ 96 ASCII 11 x 8 International Characters	

PIN GRAPHIC MODE:

Resolution:	The incoming bit pattern corresponds to the 8 upper pins in the print head • 60 dots/inch • 72 dots/inch • 120 dots/inch • 80 dots/inch • 240 dots/inch • 90 dots/inch

PRINTING FORMAT:

Line Length:	8 inches	13.2 inches
Line Spacing:	1/6", 1/8", 7/72", n/72", n/144", n/216"	
Character Spacing Standards:	10 cpi Normal 5 cpi Elongated Normal 12 cpi Compressed 6 cpi Elongated Compressed 16.7cpi Condensed 8.3cpi Elongated Condensed	
NLQ	10 cpi Normal NLQ 5 cpi Elongated Normal NLQ 10-25 cpi Proportional 5-12.5cpi Elongated Proportional	

FORMS:

	D200	D300
Form Handling	Adjustable Tractor Friction Feed	
Form Loading	Roll Paper (Optional)	Not Available for D300
	Top-rear	Top-rear and Bottom
Forms Control	Forms Length Selectable by Control	
Forms Type		
Continuous Fanfold	4" - 11" wide	4" - 15" wide
Cut Sheet (W/O Tractor)	4" - 11" wide	4" - 15"
Roll Paper (Option)	8.5" wide	Not Available
Copies:	Original +2	
Ribbon System:	Fabric Inked Ribbon Cassette	
Ribbon Life:	4 Million Characters	1 Million Characters
Others:	Paper-out Detection	

OPERATOR CONTROLS:

Switches:	Power ON/OFF ON LINE LINE FEED FORM FEED	
		ADJUST UP ADJUST DOWN
Indicators:	Power Lamp ON LINE Lamp - also used for PAPER EMPTY and ERROR (Flashing)	

INTERFACE AND COMMUNICATIONS:

Parallel:	8 bit Centronics parallel 36 pin female connector
Serial:	RS-232C DB25S Connector female
	Protocol READY/BUSY, XON/XOFF, ETX/ACK
	BAUDRATE 110, 300, 600, 1200, 2400, 4800, 9600
Data Buffer:	2K Byte

ELECTRICAL:	**D200**	**D300**
Input Power:	70 watts, operating 30 watts, standby	90 watts, operating 40 watts, standby
Voltage/Frequency: US Version	120V ± 10% 60Hz	

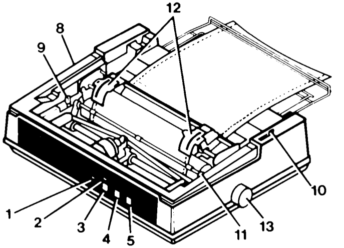


Figure 1(a). D200 (Top View)

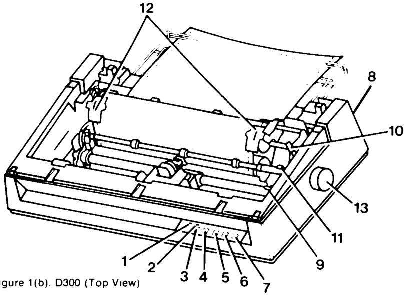


Figure 1(b). D300 (Top View)

3 DESCRIPTION

3-1 Top View

1. **POWER Indicator.** This indicator will illuminate when the printer is properly connected and the Power ON/OFF Switch is set to ON.

2. **ON-LINE Indicator.** When this indicator is ON, the printer is ON-LINE and ready to receive data.

   The lamp will flash when the printer is out of paper, when there is a carriage fault, or when there is an electrical problem.

3. **ON-LINE Switch.** To set the printer in ON-LINE mode, this switch must be depressed before the printer will print. To stop printing or to use the other Front Panel Switches, depress the ON-LINE Switch. The printer will be in the OFF-LINE mode and the ON-LINE LED will go out.

4. **LINE FEED Switch.** When this switch is depressed, the paper will advance one line. Holding the switch "down" will cause continuous paper feed.

5. **FORM FEED Switch.** When this switch is depressed, the paper will advance to the logical top of the next form.

6. **ADJUST▲Switch.** Pressing this switch causes the paper to advance 1/72 inch (1/12 line). When the switch is held down, continuous line feed is performed. The printer must be OFF-LINE before pressing this switch. (On model D300 only).

7. **ADJUST▼Switch.** Pressing this switch causes the paper to reverse index 1/72 inch (1/12 line). When the switch is held down, continuous reverse index is performed. The printer must be OFF-LINE before pressing this switch. (On model D300 only).

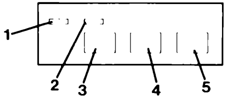
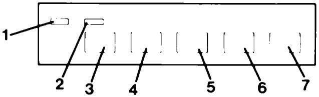


Figure 2(a). D200 Front Panel

Figure 2(b). D300 Front Panel



8. **Power ON/OFF Switch.** Depress the Power Switch to turn the power ON. Note: Turning the power OFF and ON during operation will cause loss of the current data being printed.

9. **Print Head Control Lever.** Move this Lever towards you (i.e., move the Print Head *away* from the paper) when changing ribbons. If printing is faint, move the Lever away from you (i.e., the Print Head *towards* the paper); if smudging occurs during printing, move the Print Head slightly away from the paper.

10. **Platen Pressure Lever.** When you load "tractor feeding" (fanfold paper), position this lever toward the front of the printer.
    When you load "friction feeding" paper, position this lever toward the rear of the printer to apply pressure on the platen.

11. **Paper Bail Lever.** For optimum print quality, keep the bail down on the paper (Lever toward rear of printer).

12. **Tractor Feed.** See **Setting Up the Printer** for details on using the Tractor Feed.

13. **Paper Feed Knob.** Turn this Knob to manually advance the paper.

14. **Paper Out Sensing.** When the printer stops because it is out of paper, the ON-LINE lamp will flash and the printer goes OFF-LINE. To continue printing, insert paper and press the ON-LINE switch. The printer will go back ON-LINE and continue printing. (At this time, data in the print buffer is protected)

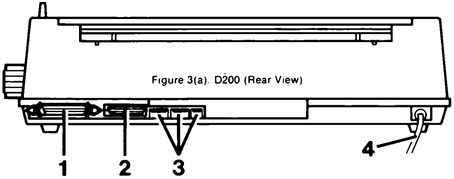


Figure 3(a). D200 (Rear View)

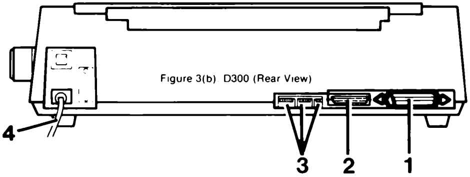


Figure 3(b). D300 (Rear View)

3-2 Rear View

1. **Parallel Interface Connector.** If your computer has parallel interface capabilities, connect the cable here.
2. **Serial Interface Connector.** If your computer has serial interface capabilities, connect the cable here.
3. **Function Selection (DIP) Switches.** The settings of these switches define the printer's use.
4. **Power Cord.** Plug the power cord into a wall-outlet or approved power strip.

4 SET-UP

4-1 Unpacking Instructions

Carefully unpack the printer, being sure to locate the Ribbon Cassette and the Paper Separator. Keep the empty box and packing material just in case you need to transport the printer.

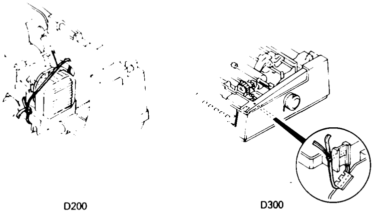


Figure 4. Removing the Yellow Tie Wrap.

You should follow this procedure every time you start-up the printer — not just the first time.

1. Find a good spot for your printer. Be sure to consider:
   - The Printer should be placed on a sturdy work surface.
   - Paper takes up space. Be sure to leave enough room for smooth paper flow.
   - Don't place the printer near noise generators such as refrigerators and industrial equipment.
2. Be sure the POWER Switch is OFF.

3. Open the Top Cover and remove the packing materials. (See figure 4).
4. Install continuous form fanfold paper or single-sheet paper. Refer to Paper Loading, see page 7.
5. Check the Ribbon Cassette. If it has not been installed, see Ribbon Installation/Replacement, see page 9.
6. Set Print Function (DIP) Switch on the rear of printer to the desired settings, see page 10.
7. Connect the interface cable to the printer interface connector.
   NOTE: Make sure power is off before connecting or disconnecting interface cable.
8. Connect the AC power plug to a 3-wire, 120 volt, 60 HZ grounded AC outlet
9. Turn the Power ON and check that the Power On indicator on the front panel is illuminated.
10. Check to see if the printer is ready by running the Self-Test.

4-2 Tractor Installation and Removal

This printer can be used with either the Tractor Feed system or the Friction Feed system.
The difference is that the Tractor Feed system is used with paper which has guide holes on both edges while the paper used with the Friction Feed system does not have these holes.

4-3 Removing the Tractor

1. Set the ON/OFF Power Switch to OFF.
2. Open the Top Cover.
3. Hold the back bar of the Tractor (close to the edges) between the thumb and forefinger of each hand and pull upward to unlock and remove the tractor.
4. Close the Top Cover.

4-4 Installing the Tractor

1. Set the ON/OFF Power Switch to OFF.
2. Open the Top Cover.
3. Place the front cutouts (A) in the Tractor unit onto the outside studs (B) (see Figure 5), then press on the rear of the Tractor until the back posts (C) snap into place.
4. Close the Top Cover.

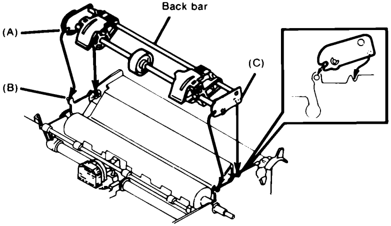


Figure 5. Installing the Tractor

4-5 Paper Loading

It is very important that the paper enters the printer correctly, see figure 6. The paper must be directly behind the printer otherwise paper skewing or jamming may occur.

Once the paper is loaded and power is ON, check the ON-LINE indicator. If the lamp is flashing, depress the ON-LINE switch. If the lamp remains flashing, the paper is probably loaded incorrectly.

If the LED is lit after the paper is loaded and the ON-LINE switch is depressed, you may begin printing.

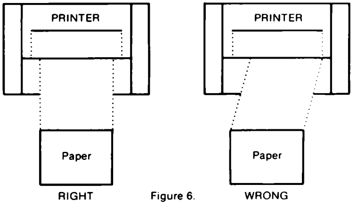


Figure 6.

4-6 Fanfold Paper Loading

The D200 will accept standard fanfold and mailing label strips from 4" to 11" wide; the D300 will accept paper up to 15" wide. The paper may be either single or multi-part, up to three parts total. **Before using fanfold paper, the Tractor Unit should be installed.**

To load fanfold paper into the Printer:

1. Set the Power ON/OFF Switch to OFF.
2. Open the Top Cover.
3. Move the Print Head Control Lever away from the paper. Refer to Figure 1.
4. Move the Platen Pressure Lever and the Paper Bail Lever toward the front of the printer.
5. Pass the paper through the Paper Insertion Opening. Return the Release Lever and turn the Paper Feed Knob to advance the paper until the paper appears between the platen and the paper bail.
6. Move the Platen Pressure Lever towards the front once again and pull out approximately 6" of paper.
7. Raise the clamps on the Paper Feed Sprocket Units, see figure 1. Align the paper guide holes with the sprockets and snap the clamps back.
    - If the paper guide holes do not fit over the sprockets, release the lever on the Sprocket Units, re-position the Unit, then snap the lever closed. If the paper is too taut or is too loose and wrinkled, it may not feed correctly.
    - Be sure that the paper is straight when it is clamped onto the sprockets.
8. On the D200 adjust the Paper Guides on the top rear of the printer so that there is a small space between the guides and the paper edges.
9. Adjust the Print Head Control Lever as follows:
    - **Single-Part Forms.** Move the Control Lever toward the platen as far as it will go.
    - **Multiple-Part Forms.** Move the Control Lever toward the platen as far as possible without smudging the paper. Check for smudging by manually moving the carriage back and forth across the paper at each of the lever settings.

    Caution! The Print Head Control Lever must always be as close to the platen as possible, otherwise damage to the Print Head may result.
10. Close the Top Cover.

Note: On the D300 you can feed the fanfold paper thru the bottom of the machine, see figure7(b) for paper path. Follow the above steps for inserting the paper.

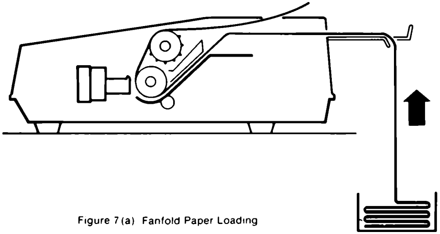


Figure 7(a) Fanfold Paper Loading

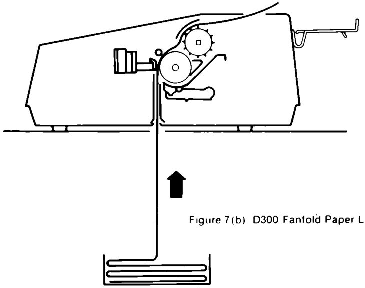


Figure 7(b) D300 Fanfold Paper Loading

Note:
- **Whenever the Tractor Feed is used, the Platen Pressure Lever must be toward the front of the printer. For friction feed paper, set the lever to the rear of the printer to apply pressure to the paper.**
- **Be sure that the paper is positioned so that it can travel through the printer without binding.**
- **Do not let paper pile up on top of unprinted paper or printed paper may be pulled back into the Paper Insertion Opening. This could jam the paper feed or damage the printer.**

4-7 Single-Sheet Paper Loading

We suggest you remove the tractor feed unit before loading single-sheet paper into the printer, see figure 5.

1. Be sure the Power Switch is OFF.
2. Open the Top Cover.
3. Gently move the Print Head Control Lever away from the paper.
4. Tilt the Paper Bail Lever forward (toward the front of the printer).
5. Insert the paper into the Paper Insertion Opening and push the Platen Pressure Lever back towards the rear of the printer. Use the Paper Feed Knob to advance the paper until it appears between the Platen and the Print Head, see figure 8 .
6. Move the Platen Pressure Lever forward and align the paper. Restore the Platen Pressure Lever
7. Restore the Paper Bail.
8. For the D200 adjust the Paper Guides on the top rear of the printer so that there is a small space between the guides and the paper edges.
9. Set the Print Head Control Lever to the appropriate position:
   - Single-Part Forms. Move the lever towards the paper as far as it will go.
   - Multiple-Part Forms. Move the lever as far as it will go toward the platen without smudging the paper. Check for smudging by moving the carriage back and forth at each of the lever settings.

   Note: If you use carbon paper or other duplicate form paper with the friction feed system, take extreme care when inserting the paper. A slight shifting of paper between the original and the copy could occur, resulting in poor printing or improper registration.

   Caution! The Print Head Control Lever must always be set as close to the platen as possible; otherwise damage to the Print Head may result.
10. Close the Top Cover.

    Note: When the paper reaches the end of a page, the printer will automatically stop printing about 1" from the bottom of the page. If you want to print a few extra lines, press ON/LINE and another line will be printed. Press ON/LINE again and another line will be printed, etc. We do not recommend that you print more than three extra lines if you are using Friction Feed (single-sheet).
    We do not recommend that you attempt to use the ON/LINE Switch if the extra lines require reverse line feeds (Superscript or subscript for example).
    If you do not want to print extra lines, load a new piece of paper into the printer and depress the ON-LINE Switch once. The printer will be restored to the status just before the "out-of-paper" condition occurred.

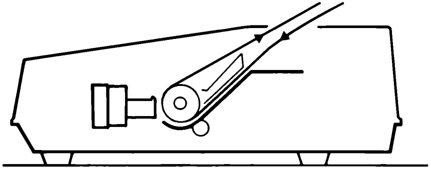


Figure 8. Single-Sheet Paper Feeding

4-8 Ribbon Installation and Replacement

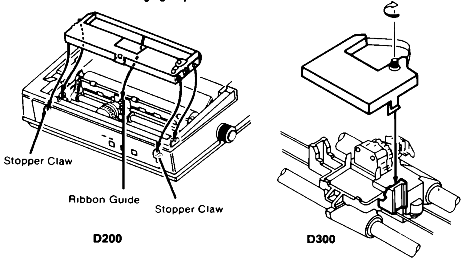
If the Ribbon Cassette is already installed, simply check to see that is is properly threaded between the Ribbon Guide and Print Head, see figure 9

If the Ribbon Cassette is not installed, or if it must be replaced due to excessive wear or faint printing, follow this procedure:

1. Set the Power switch to OFF. **(Note: When you turn the power OFF, any information stored in the printer's buffer will be lost.)**
2. Open the Top Cover and Access Cover, gently move the Print Head Control Lever toward the front of the printer as far as it will go.
3. Gently move the Print Head towards the center of the printer
4. To remove the used Ribbon Cassette, grasp the cassette by the edges nearest to the platen and lift it upwards and out.
5. Before installing the new cassette, tighten its ribbon by turning the knob on the cassette in the direction indicated by the arrow.
6. Gently press the Cassette down until it is firmly secured by the "stopper claws."

   Do not force the cassette into place! If the Cassette is not properly positioned, the cassette knob will not match up with the ribbon drive shaft. Do not force the cassette down but set it in gradually while turning the cassette knob in the indicated direction.
7. Once the new cassette is installed, gently slide the ribbon in between the Ribbon Guide and the Print Head. Tighten the ribbon by turning the cassette knob in the indicated direction.
8. Move the carriage back and forth manually to check that the ribbon advances properly. If the ribbon has not been properly positioned between the paper and Print Head (i.e., into the Print Head Ribbon Guide), the ribbon will not feed smoothly.
9. Move the Print Head Control Lever towards the rear of the printer.
10. Close the Access Cover and the Top Cover.

Remember! It is extremely important that the Print Head is as close to the paper as possible; otherwise damage to the Print Head may occur. To find the proper distance, move the Print Head Control Lever towards the paper and move the carriage back and forth until smudging occurs. Then gradually move the Control Lever away from the paper until the smudging stops.

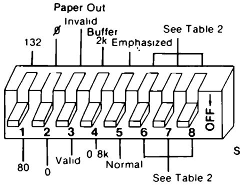

Stopper Claw
Ribbon Guide
Stopper Claw

D200 **D300**

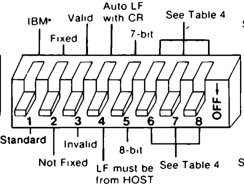
Figure 9. Ribbon Cassette Installations

4-10 Setting DIP Switches

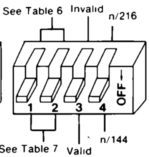
There are three DIP switches at the rear of the printer. These switches allow you to customize some of the printer features for your own applications, and set the default values for the printer's operational parameters. Settings in bold print are factory settings.


Paper Out
Invalid
132
Ø
Buffer
2k
Emphasized
See Table 2
1
2
3
4
5
6
7
8
OFF
80
0
Valid
0.8k
Normal
See Table 2

DIP Switch No. 1


IBM®
Fixed
Valid
Auto LF with CR
7-bit
See Table 4
1
2
3
4
5
6
7
8
OFF
Standard
Not Fixed
Invalid
LF must be from HOST
8-bit
See Table 4

DIP Switch No. 2


See Table 6
Invalid
n/216
1
2
3
4
OFF
See Table 7
Valid
n/144

DIP Switch No. 3

NOTE: The switch settings shown are for using the standard control set (switch 2-1 : OFF). See section 7 for DIP Switch settings for IBM® control set.

Setting DIP Switch No. 1

Before you turn the Power Switch ON you can set or select different kinds of print functions by setting this switch.

Note: When you turn the power OFF, any information stored in the printer's buffer will be lost.

Table 1. Function of DIP Switch No. 1 Switch 2-1 OFF

Switch Pin No	Function	OFF	ON
1-1	10 Pitch Column length	**80 (D200)** **132 (D300)**	132 (D200) 220 (D300)
1-2	ZERO font	0	Ø
1-3	Paper Out Detector	Valid	Invalid
1-4	Input Buffer	0.8K (For Download Characters)	2K
1-5	Print mode at POWER ON	**Normal**	Emphasized
1-6	International character set	See Table 2 and 3	
1-7			
1-8			

Table 2. International Character Set Designation

Country	SW1-6	SW1-7	SW1-8
U.S.A.	**ON**	**ON**	**ON**
GERMANY	OFF	ON	ON
ENGLAND	ON	OFF	ON
FRANCE	OFF	OFF	ON
SPAIN	ON	ON	OFF
HOLLAND	OFF	ON	OFF
CANADA	ON	OFF	OFF
SWISS	OFF	OFF	OFF

Table 3. International Character Set Hex Code

Nation	23	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A.	#	@	[	\	]	^	`	{	¦	}	~
GERMANY	#	§	Ä	Ö	Ü	^		ä	ö	ü	ß
ENGLAND	£	@	[	\	]	^		{		}	–
FRANCE	#	à	°	ç	§	^		é	ù	è	
SPAIN	#	@		Ñ	¿	^		°	ñ	ç	~
HOLLAND	£	@	[	ƒ	]	^		{	¨	}	
CANADA	#	@	[	ç	]	^		é	ù	è	
SWISS	£	à	é	ç	ê	^		ä	ö	ü	–

Setting DIP Switch No. 2

Table 4. Function of DIP Switch No. 2

Switch Set No.	Function	OFF	ON
2-1	Control Set	Standard	IBM®
2-2	SLCT IN Signal internally fixed or not fixed	Not Fixed	**Fixed**
2-3	1 inch Skip-over perforation	**Invalid**	Valid
2-4	Automatic Line Feed	LF must be from HOST	**Auto LF with CR**
2-5	Character Length Format	**8 data bits**	7 data bits
2-6	Interface/Baud Rate	See Table 5	
2-7			
2-8			

Table 5. Serial Baud Rate and Interface select

Baud rate	SW2-6	SW2-7	SW2-8
110	ON	ON	ON
300	OFF	ON	ON
600	ON	OFF	ON
1200	OFF	OFF	ON
2400	ON	ON	OFF
4800	OFF	ON	OFF
9600	ON	OFF	OFF
Parallel	**OFF**	**OFF**	**OFF**

Setting DIP Switch No. 3

Table 6. Function of DIP Switch No. 3

Switch Pin On	Function	OFF	ON
3-1 3-2	Protocol Selection	See Table 7	
3-3	Parity check	**Valid**	Invalid
3-4	Vertical Increment	n/144"	n/216"

Table 7. Protocol Selection

Method	**SW3-1**	**SW3-2**
Ready Busy	**ON**	**ON**
XON XOFF	OFF	ON
ETX ACK	ON	OFF
	OFF	OFF

With Switch 2-1 ON for IBM®

Table 8. Function of DIP Switch No. 1

Switch Pin No.	Function	OFF	ON
1-1	Not Used		—
1-2	CR	CR · LF	CR
1-3	Buffer full	CR · LF	CR
1-4	Cancel Code	Valid	Invalid
1-5	Line Spacing	1/6"	1/8"
1-6	Form Length	11"	12"
1-7	Character Generator	See Table 5	See Table 6
1-8	Not Used	—	—

5. Interfacing

5-1 General

The printer is fitted with a RS-232-C serial interface and Centronics type parallel interfaces The selection of serial or parallel interface is by DIP switches SW 2-6. 7 and 8 (see page 11) The printer has a choice of protocols for the serial interface (READY BUSY. XON XOFF and ETX ACK) and provides a handshake protocol for the parallel interfaces

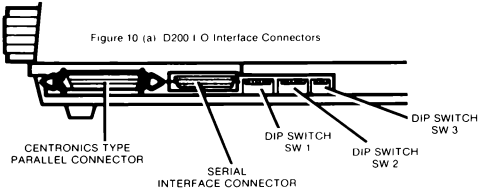


Figure 10 (a) D200 I O Interface Connectors
CENTRONICS TYPE PARALLEL CONNECTOR
SERIAL INTERFACE CONNECTOR
DIP SWITCH SW 1
DIP SWITCH SW 2
DIP SWITCH SW 3

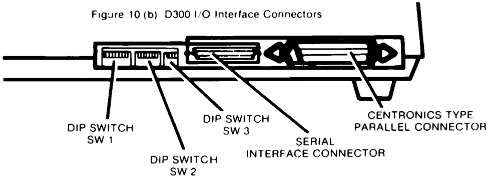


Figure 10 (b) D300 I/O Interface Connectors
DIP SWITCH SW 1
DIP SWITCH SW 2
DIP SWITCH SW 3
SERIAL INTERFACE CONNECTOR
CENTRONICS TYPE PARALLEL CONNECTOR

5-2 Parallel Interface

- **Connector**

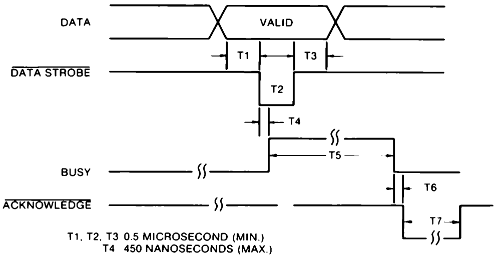
Type	36 Pin Receptacle
Model	AMP champ series (P/N 552742-1) or equivalent.

- **Connector Pin Assignment**

Pin No	Signal	Description
1	$\overline{\text{STROBE}}$	DATA STROBE INPUT from computer
2	DATA 0	PARALLEL DATA from computer
3	DATA 1	
4	DATA 2	
5	DATA 3	
6	DATA 4	
7	DATA 5	
8	DATA 6	
9	DATA 7	
10	$\overline{\text{ACK}}$	DATA ACKNOWLEDGE OUTPUT from printer
11	BUSY (Note 1)	BUSY OUTPUT from printer
12	PE (Note 2)	PAPER EMPTY OUTPUT from printer
13	SLCT (Note 3)	SELECTED OUTPUT from printer
14	$\overline{\text{AUTO FEED XT}}$ (Note 4)	AUTO LINE FEED INPUT from computer
15	-	Not used — Not terminated
16	GROUND	Signal Ground
17	CHASSIS GROUND	Chassis Ground
18	+ 5V	5V REGULATED OUTPUT at 50 mA (MAX.)
19-30		Return Lines GND level
31	$\overline{\text{INIT}}$ (Note 5)	INITIALIZE PRINTER INPUT from computer
32	$\overline{\text{ERROR}}$ (Note 6)	PRINTER ERROR OUTPUT from printer
33	NC	No Connection
34		Not used — Not terminated
35	-	Pull up to + 5V
36	$\overline{\text{SLCT IN}}$ (Note 7)	SELECT INPUT from computer

Note 1 HIGH indicates that the printer cannot receive data
Note 2 HIGH indicates Paper End
Note 3 HIGH when On-line
Note 4 With this signal being at "LOW" level, the paper is automatically fed one line after printing.
Note 5 Can be reset to power-up condition by computer setting this line "LOW"
Note 6 LOW when Paper End, Off-line or Error
Note 7 The DC1/DC3 code is only valid when this signal is HIGH

- **Data Transmission Timing**


DATA
VALID
T1
T3
$\overline{\text{DATA STROBE}}$
T2
T4
T5
BUSY
T6
$\overline{\text{ACKNOWLEDGE}}$
T7

T1, T2, T3 0.5 MICROSECOND (MIN.)
T4 450 NANOSECONDS (MAX.)
T5 50 MICROSECONDS (MIN.)
MAXIMUM IS OPERATOR DEPENDENT
T6 450 NANOSECONDS (MAX.)
T7 5 MICROSECONDS

Note 1 All Signal are based on TTL level.
Note 2 Interface Cable shall not exceed 10 feet in length.

5-3 Serial Interface

- **Connector**

Type	Standard 25-pin female D-Shell connector
Model	DB-25S

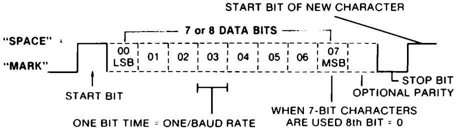
- **Connector Pin Assignment**

Pin No.	Signal	Description
1	PGND	Tied to ground.
2	TXD	Transmitted data from printer to sending device (used to send transmission control characters.)
3	RXD	Serial data from sending device to printer.
4	RTS	BUSY output from printer to sending device READY equals HIGH.BUSY equals LOW.Polarity of the BUSY output can be inverted by solder bubble.
7	SGND	Signal Ground
11		BUSY output from printer to sending device Same as Pin 4.
18	5V	+ 5V regulated output at 40mA (max.)
20	DTR	BUSY output from printer to sending device Same as Pin 4.
All Others		Not used — Not terminated.

- **Data Format**

Data is received serially, bit-by-bit, asynchronously. One start bit is always required. At least one stop bit is required.
The RS232C Serial Interface expects to receive the low order bit first in each character.

Data length	7 or 8 bits	(Selectable by DIP SW 2-5)
Parity	Valid, Invalid	(Selectable by DIP SW 3-3, 3-4)


START BIT OF NEW CHARACTER
7 or 8 DATA BITS
"SPACE"
"MARK"
00 LSB
01
02
03
04
05
06
07 MSB
STOP BIT
START BIT
OPTIONAL PARITY
WHEN 7-BIT CHARACTERS ARE USED 8th BIT = 0
ONE BIT TIME = ONE/BAUD RATE

- **Data Rate**

The baud rate is selectable by configuration switch.
(See at page 11.)

- **Interface Protocol**

(1) XON/XOFF Protocol

Using the XON/XOFF protocol, the data source becomes synchronized with the printer as described below.

After successfully powering up and becoming enabled to send, the printer sends an XON control character and constantly monitors the number of empty character positions in the input buffer. When the number is less than 256, the printer sends an XOFF control character, signaling the data source to temporarily stop sending data. Meanwhile, the printer continues to take characters from the input buffer and print or otherwise process them. When the number of empty positions in the buffer exceeds 1792, the printer sends an XON control character, thus signaling that transmission may resume.

The printer also sends an XOFF control character when it is not ready due to error conditions or OFF-LINE. Running out of paper or detecting a print head position failure causes an XOFF control character to be sent.

(2) READY/BUSY Protocol

The Ready/Busy protocol is functionally the same as the XON/XOFF protocol. However, instead of sending an XOFF control character, the printer places the Ready/Busy signal in the Busy state, and instead of sending an XON control character, the printer places the Ready/Busy signal in the Ready state.

(3) ETX/ACK Protocol

This is a software handshake protocol available for serial input. After becoming enable to send, the printer sends an "ACK" (acknowledge) to the host computer. The host computer sends up to 256 characters followed by the ASCII control character "ETX" (end of text).
The printer receives the character and stores them in a first-in/first-out fashion in the input buffer. Once the input buffer is emptied, the printer transmits the ASCII control character "ACK" to the host computer. The host computer most not transmit another frame of serial data until the "ACK" character is received.

6 CONTROL CODES USING THE STANDARD CONTROL SET

6-1 Control Code Summary

PRINT MODE

NAME		CODE				Function	Ref Page
		Dec		Hex			
SO		14		0E		Sets Elongated mode	16
SI		15		0F		Sets Condensed mode	16
DC2		18		12		Cancels Condensed mode	16
DC4		20		14		Cancels Elongated mode	16
ESC	SO	27	14	1B	0E	Sets Elongated mode	16
ESC	SI	27	15	1B	0F	Sets Condensed mode	16
ESC	4	27	52	1B	34	Selects Alternate mode	17
ESC	5	27	53	1B	35	Deselects Alternate mode	17
ESC	!	27	33	1B	21	Select Print mode	17
ESC	—	27	45	1B	2D	Sets or cancels Underlined mode	17
ESC	E	27	69	1B	45	Sets Emphasized mode	17
ESC	F	27	70	1B	46	Cancels Emphasized mode	17
ESC	G	27	71	1B	47	Sets Double-Strike mode	17
ESC	H	27	72	1B	48	Cancels Double-Strike mode	17
ESC	M	27	77	1B	4D	Selects Elite-size mode	18
ESC	P	27	80	1B	50	Selects Normal (Pica size) mode	18
ESC	S 0	27	83 0	1B	53 00	Sets Superscript mode	18
ESC	S 1	27	83 1	1B	53 01	Sets Subscript mode	18
ESC	T	27	84	1B	54	Cancels Superscript or Subscript mode	18
ESC	W	27	87	1B	57	Sets or cancels Enlarged mode	18
ESC	p	27	112	1B	70	Sets or cancels Proportional spacing	18
ESC	:	27	59	1B	3B	Selects NLQ	18

BIT IMAGE

NAME	CODE				Function	Ref. Page
	Dec.		Hex.			
ESC *	27	42	1B	2A	Selects 8-pin bit image mode	19
ESC K	27	75	1B	4B	Sets Normal-density bit image mode (60 DPI)	19
ESC L	27	76	1B	4C	Sets Dual-density bit image mode (120 DPI)	20
ESC Y	27	89	1B	59	Sets the Double-speed, dual-density bit image mode (120 DPI)	20
ESC Z	27	90	1B	5A	Sets Quadruple-density bit image mode (240 DPI)	20

LINE SPACING

NAME	CODE				Function	Ref. Page
	Dec		Hex			
ESC 0	27	48	1B	30	Sets line spacing to 1/8 inch	20
ESC 1	27	49	1B	31	Sets line spacing to 7/72 inch	21
ESC 2	27	50	1B	32	Sets line spacing to 1/6 inch	21
ESC 3	27	51	1B	33	Sets line spacing to n/144 or n/216 inch	21
ESC A	27	65	1B	41	Sets line spacing to n/72 inch	21

PAPER FEED EXECUTION

NAMF	CODE				Function	Ref. Page
	Dec.		Hex.			
LF	10		0A		Line Feed	21
ESC J	27	74	1B	4A	Executes paper feed (n/144 or n/216 inch)	21
ESC N	27	78	1B	4E	Sets skip-over perforation	21
ESC O	27	79	1B	4F	Cancels skip-over perforation set	21
ESC j	27	106	1B	6A	Reverse feed (n/144 or n/216 inch)	22

FORMAT CONTROL

NAME	CODE				Function	Ref. Page
	Dec.		Hex.			
BS	8		08		Backspace	22
HT	9		09		Horizontal TAB	22
VT	11		0B		Vertical TAB	22
FF	12		0C		Form Feed	22
ESC /	27	47	1B	2F	Selects VFU channel	23
ESC B	27	66	1B	42	Sets VT	23
ESC C	27	67	1B	43	Sets form length by number of line	23
ESC C 0	27	67 0	1B	43 00	Sets form length in inches	23
ESC D	27	68	1B	44	Sets HT	23
ESC Q	27	81	1B	51	Sets the column width	23
ESC b	27	98	1B	62	Sets VFU positions	24
ESC l	27	108	1B	6C	Sets the left margin	24

INPUT DATA CONTROL

NAME	CODE				Function	Ref. Page
	Dec.		Hex.			
CAN	24		18		Cancels all the data stored in the print buffer.	24
DC1	17		11		Selects the printer	24
DC3	19		13		Deselects the printer	24
DEL	127		7F		Clears the last byte in the print buffer	24
ESC 6	27	54	1B	36	Printable code area expansion (NA in 7 bit serial)	24
ESC 7	27	55	1B	37	Control code area selection	25

INPUT DATA CONTROL

NAME	CODE				Function	Ref. Page
	Dec.		Hex.			
ESC =	27	61	1B	3D	MSB = 0 setting	25
ESC >	27	62	1B	3E	MSB = 1 setting	25
ESC #	27	35	1B	23	Cancels the MSB control sequence	25
ESC I	27	73	1B	49	Selects 0 ~ 31Dec. or 128~159 Dec. codes as control codes or printable	25

DOWNLOAD CHARACTER (MAX. 96 characters, buffer becomes 896)

NAME	CODE		Function	Ref. Page
	Dec.	Hex.		
ESC &	27 38	1B 26	Defines Download CG.	26
ESC % 0	27 37 0	1B 25 00	Selects internal ROM CG.	27
ESC % 1	27 37 1	1B 25 01	Selects Download CG.	27
ESC : 0	27 58 0	1B 3A 00	Copies the fonts in ROM CG into Download CG.	26

MISCELLANEOUS

NAME	CODE		Function	Ref. Page
	Dec.	Hex.		
CR	13	0D	Carriage Return.	27
ESC 8	27 56	1B 38	Deselects the paper-end detector.	27
ESC 9	27 57	1B 39	Selects the paper-end detector.	27
ESC <	27 60	1B 3C	Prints from left most to right for one line.	27
ESC @	27 64	1B 40	Initialized the printer (clears the buffer).	27
ESC R	27 82	1B 52	Selects the international character set.	28
ESC U	27 85	1B 55	Starts or ends unidirectional printing.	28

NON-COMMAND SEQUENCE

Operation	Function	Ref. Page
Power ON while holding LF	SELF-TEST	28
Power ON while holding down LF and FF	HEX. DUMP	28

6-2 Print Mode

SO

Shift out

When the SO code is input, all data that follows this code on the same line is printed out in elongated characters. A Carriage Return (auto LF mode), Line Feed, DC4 or ESC W cancels elongated mode. Normal and elongated characters can be mixed on the same line.

Example:

```
      LPRINT CHR$ (14);
```

SI

Shift In

When SI code is input, all the data stored in the buffer is printed and the subsequent data is printed out in condensed characters (16.7 characters per inch). DC2 cancels condensed mode.

When SO (Shift Out) code is input in condensed mode, condensed enlarged characters (8.3 characters per inch) can be printed.

Example

```
      LPRINT CHR$ (15);
```

DC2

Condensed mode cancel

The DC2 code cancels the condensed mode set by the SI code.

Example:

```
      LPRINT CHR$ (18);
```

DC4

Elongated mode cancel

The DC4 code cancels the Elongated mode set by the SO code.

Example:

```
      LPRINT CHR$ (20);
```

ESC SO

Elongated mode setting

Same as SO

Example:

```
      LPRINT CHR$ (27); CHR$ (14);
```

ESC SI

Condensed mode setting

Same as SI

Example:

```
      LPRINT CHR$ (27); CHR$ (15);
```

ESC 4

Alternate mode selection

Input of the ESC4 code causes the data following this code to be printed in Alternate mode.

In Alternate mode all data is printed in italic characters.

Example:
LPRINT CHR$ (27); "4";

ESC 5

Alternate mode cancel

This code cancels the Alternate mode set by the ESC 4 code.

Example:
LPRINT CHR$ (27); "5";

ESC !

Selects Print Mode

Format: ESC !;n;
The subsequent print mode is selected. The following print modes can be set:

1. Font designation Pica (Condensed)
   Elite
   NLQ
2. Double strike mode
3. Emphasized mode
4. Elongation mode

See Table 1 for the print modes selected by each value of n.

Table 1

n	Pica 10 CPI	Elite 12 CPI	Condensed 16.7 CPI	Elongate	Emphasized	Double Strike	NLQ	You may also use n
0	X							2
1		X						3, 5, 7, 9, 11, 13, 15
4			X					6
8	X				X			10, 12, 14
16	X					X		18
17		X				X		19, 21, 23, 25, 27, 29, 31
20			X			X		22
24	X				X	X		26, 28, 30
32	X			X				34
33		X		X				35, 37, 39, 41, 43, 45, 47
36			X	X				38
40	X			X	X			42, 44, 46
48	X			X		X		50
49		X		X		X		51, 53, 55, 57, 59, 61, 63
52			X	X		X		54
56	X			X	X	X		58, 60, 62
64	X						X	65-71
72	X				X		X	73-79
80	X					X	X	81-87
88	X				X	X	X	89-95
96	X			X			X	97-103
104	X			X	X		X	105-111
112	X			X		X	X	113-119
120	X			X	X	X	X	121-127

ESC —

Underlined print mode

Format: ESC —; n;
ESC — followed by a 1 or 49, prints all of the following data with an underline.

ESC — followed by a 0 or 48, cancels the Underline print mode.

Example:
LPRINT CHR$ (27); "—"; CHR$ (1);

ESC E

Emphasized mode setting

When this code is input, all the data stored in the print buffer is printed out and then the data following this code is printed in emphasized characters.

Emphasized printing gives each character a stronger impression.

Example:
LPRINT CHR$ (27); "E";

ESC F

Emphasized mode cancel

The ESC F code cancels the Emphasized mode set by the ESC E code.

Example:
LPRINT CHR$ (27); "F";

ESC G

Sets Double Strike Mode

When the ESC G code is input, all characters are printed in 2 passes. After the first pass, the paper is fed vertically 1/144", and then the line is printed again.

Example: LPRINT CHR$ (27); "G"

ESC H

Cancels Double Strike Mode

An ESC H cancels the Double Strike Mode set by an ESC G.

Example: LPRINT CHR$ (27); "H"

ESC M

Compressed mode setting

Input of ESC M code causes the data following this code to be printed in Compressed characters (12 CPI).

In this mode, Emphasized or Condensed modes are not useable.

Example:

```
LPRINT CHR$ (27); "M";
```

ESC P

Normal mode setting

When the ESC P code is input, all the data following this code is printed out in Normal characters (10 CPI).

This code cancels the Compressed mode or NLQ mode.

Example:

```
LPRINT CHR$ (27); "P";
```

ESC S 0
ESC S 48

Superscript mode setting

When the ESC S 0 or ESC S 48 code is input, all the data following this code is printed in Superscript mode. In this mode, a character measuring half the height of a standard character is printed on the upper half of a line.

This code can be cancelled by input of the ESC T code.

Example:

```
LPRINT CHR$ (27). "S"; CHR$ (0);
```

ESC S 1
ESC S 49

Subscript setting

When the ESC S 1 or ESC S 49 code is input, the data following this code is printed in Subscript mode.

In this mode, a character measuring half the height of a standard character is printed on the lower half of a line.

This code can be cancelled by input of the ESC T code.

Example:

```
LPRINT CHR$ (27); "S"; CHR$ (1);
```

ESC T

Superscript/Subscript mode cancel

The ESC T code cancels the Superscript or Subscript mode set by the ESC S 0 or ESC S 1 code, respectively.

Example:

```
LPRINT CHR$ (27); "T";
```

ESC W

Enlarged mode setting

Format: ESC W; n;
Changes the printer to the double width mode when ESC W is followed by a 1 or 49. This mode is not cancelled by a line feed operation and must be cancelled with ESC W followed by a 0 or 48.

The ESC W 0 or ESC W 48 code also cancels the Enlarged mode set by the SO code.

Example:

```
LPRINT CHR$ (27); CHR$ (87); CHR$ (1);
```

ESC p

Proportional spacing mode

Format: ESC p; n;
This code is used to select Proportional spacing mode

n = 1 or 49 for Proportional spacing
n = 0 or 48 for Normal spacing

In Proportional spacing mode, BS and DEL are not accepted.

Example:

```
LPRINT CHR$ (27); "p"; CHR$ (0);
```

ESC;

Selects NLQ

When the ESC; code is input, all the data following this code is printed out in Near Letter Quality.

This mode can be cancelled by input of ESC P or ESC M code.

Example:

```
LPRINT CHR$ (27); CHR$ (59);
```

6-3 BIT IMAGE

ESC *

8-pin bit image mode
Format: ESC *; m; n1; n2;
This code selects 8-pin bit image mode.

m	MODE	DOTS/LINE D200	DOTS/LINE D300	DOTS/ INCH	HEAD SPEED (INCH/SEC)
0	Normal Density	480	792	60	16
1	Dual Density	960	1584	120	8
2	Double Speed, Double Density	960	1584	120	16
3	Quad Density	1920	3168	240	8
4	CRT Graphics I	640	1056	80	12
5	Plotter Graphics	576	950	72	13.3
6	CRT Graphics II	720	1188	90	10.7

m 0	same as ESC K
m 1	same as ESC L
m 2	same as ESC Y
m 3	same as ESC Z

For the procedure to obtain n1 and n2, please refer to ESC K.

If the value specified for m is not in the range of 0-6, the specified number of data will be ignored.

Example: LPRINT CHR$ (27); "*"; CHR$ (0); CHR$ (0); CHR$ (1);

ESC K

Normal Density Bit Image (8-pin)
Format: ESC K; n1; n2;
This code sets Normal-Density bit image mode. When this code is input, the data following ESC K code is printed out as dot pattern (s).

After the completion of the bit image printing, the printer will automatically return to Text mode.

The number of bit image data bytes is equal to n1 + 256n2 and cannot exceed 480 bytes (792 bytes with D300). At each horizontal position each byte can print up to 8 vertical dots. Bit image data may be mixed with Text data on the same line.

Assign values to n1 and n2 as follows: n1 represents values from 0-255. n2 represents values from 0-1 x 256 (from 0-3 x 256 with D300) for standard density bit image mode. See the following chart for the range of n2 for each mode.

Examples:

1. If the total number of data is less than or equal to 255 then, n1 = the number of data and n2 = 0.

   Therefore, if your bit image data is 206 bytes, n1 = 206 and n2 = 0.

2. If the total number of data is equal to or greater than 256, then n2 = the quotient of the number of data divided by 256 and n1 is the remainder.

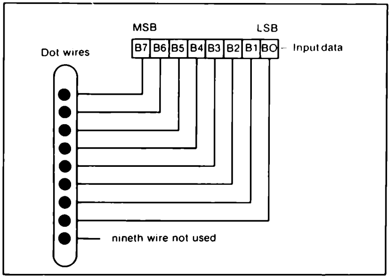
   If your bit image data is 463 bytes long, then n2 = 1 (463 ÷ 256 = 1 +) and n1 = 207 (463 - 256 = 207)

NOTE: n1 range is always 0-255.

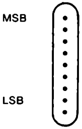
m	MODE	n2 Range D200	n2 Range D300
0 or ESC K	Normal Density	0-1	0-3
1 or ESC L	Dual Density	0-3	0-6
2 or ESC Y	Double Speed, Double Density	0-3	0-6
3 or ESC Z	Quad Density	0-7	0-12
4	CRT Graphics I	0-2	0-4
5	Plotter Graphics	0-2	0-3
6	CRT Graphics II	0-2	0-4

The figure below shows the relationship between the bit image data and the dot wires in the Print Head.

You can arbitrarily control the top 8 dot wires in the Print Head.



In the Bit Image Graphics Modes, each pin in the Printhead is assigned a number value as follows:



Decimal Value	Bit
128	7
64	6
32	5
16	4
8	3
4	2
2	1
1	0
0	not used

To control which pins fire, the data is the sum of the values assigned to the pins you wish to activate.

Examples:

1. To fire the top and bottom pins, send the number 129 since the top pin has a value of 128 and the bottom pin, a value of 1.
2. To fire the bottom 4 pins, send a value of 15 (1+2+4+8 = 15).

In the standard density bit image mode, the maximum number of dot positions printable per line is 480. Therefore, the values of n1 and n2 specified in excess of 480 dot positions are ignored and printing of the bit image data after the 480th dot position is not guaranteed. Mixing of text data and bit image data is possible on the same line.

(Ex. 1) Input data

Text (20 characters)	ESC	K	n=480 Bit-image data	Next data

20 characters in Text mode correspond to 120 bit image positions (20 x 6 = 120). Therefore, the remaining printable positions in Bit image mode becomes 360. Data can be printed but the remaining 120 data are ignored and thus not printed.

```
10  'Bit Image Printing (NORMAL DENSITY)
20  FOR X = 1 TO 5
30  LPRINT CHR$ (27); "K"; CHR$ (0); CHR$ (1)
40  FOR Y = 0  TO 255
50  LPRINT CHR$ (Y);
60  NEXT
70  LPRINT
80  NEXT
90  END
```

ESC L **Dual-density bit image (8-pin)**

Format: ESC L; n1; n2;
This code sets the Dual-density bit image mode. The dot pattern indicated by n1 and n2 following ESC L will be printed in dual density. (i.e., 120 DPI).

The transfer sequence of bit image data is the same as with the ESC K (standard density bit image printing), but bit image printing can be performed in twice the dot density in the horizontal direction as with the ESC K. In other words, bit image data can be printed in 960 dot positions per line, thus permitting to produce denser graphic data. (1584 on the D300).

If data above this amount is specified, the excess will be ignored.

After the completion of bit image printing, the printer will automatically return to Text mode.

Mixing of normal-density bit image with dual-density bit image on a line is at your option, as well as mixing with characters in Text mode.

Example:

```
LPRINT CHR$ (27); "L"; CHR$ (10); CHR$ (2);
```

ESC Y **Double speed, dual-density bit image mode**

Refer to ESC • 2

ESC Z **Quadruple-density bit image mode**

Refer to ESC • 3

6-4 LINE SPACING

ESC 0 **1/8 inch line spacing**

Input of the ESC 0 code causes the subsequent line spacing to be set at 1/8 inch.

Example:

```
LPRINT CHR$ (27); "0";
```

ESC 1

7/72 inch line spacing

Input of the ESC 1 code causes the subsequent line spacing to be set at 7/72 inch.

Example:

```
      LPRINT CHR$ (27); "1";
```

ESC 2

1/6 inch line spacing

Input of the ESC 2 code causes the subsequent line spacing to be set at 1/6 inch.

Example:

```
      LPRINT CHR$ (27); "2";
```

NOTE: This is the default setting for the printer.

ESC 3

n/144 inch line spacing

Format: ESC 3; n;
This code sets the amount of line spacing in units of 1/2 dot.

Input of the ESC 3; n code causes the subsequent line spacing to be set at n/144 inch.

The example below sets the paper feeding to 18/144 (1/8) inch. The value of n must be between 1 and 255.

Example:

```
10  'n/144 Inch Line Spacing
20  LPRINT CHR$ (27); "3"; CHR$ (18);
30  FOR X = 1 TO 4
40  LPRINT "18/144 Inch Line Spacing"
50  NEXT
```

NOTE: If Dip Switch 3-4 is ON, then this code will set line spacing in units of 1/3 dot or 1/216".

ESC A

Line space setting

Format: ESC A; n;
This code sets the amount of line spacing to n/72 inch. The example below tells the printer to set line feeding to 9/72 inch. The value of n must be between 1 and 85.

The ESC A is input, the specified amount of line spacing will remain unchanged until the new line spacing is set.

Example:

```
      LPRINT CHR$ (27); "A"; CHR$ (9);
```

6-5 PAPER FEED EXECUTION

LF

Line feed

Spaces the paper up one line. Line spacing is 1/6 inch unless reset by ESC A, ESC 0, ESC 1, or ESC 3. When this code is input, all the data stored in the print buffer is printed out and then line feed is carried out. If no data precedes the LF code, or if all preceding data are SPACES, only line feed is performed.

Example:

```
      LPRINT CHR$ (10);
```

ESC J

Paper feed execution

Format: ESC J; n;

When ESC J is sent to the Printer, the paper will feed in increments of n/144 of an inch. The value of "n" must be between 0 and 255. The example below gives a line feed of 50/144 inch. ESC J is cancelled after the line feed takes place.

Example:

```
10  '"Paper Feed execution"
20  LPRINT "This is base line . . . . . . . . . ."
30  LPRINT CHR$ (27); "J"; CHR$ (50);
40  LPRINT "Paper feed execution"
50  LPRINT "NOW 1/6 Inch Line Spacing is carried out"
```

NOTE: If DIP Switch 3-4 is ON, the paper will feed in increments of 1/216".

ESC N

Skip-over perforation setting

Format: ESC N; n;
Sets the skip perforation function, which specifies the number of lines,"n", to be skipped at the bottom of a page.

The example shows a 6 line skip perforation. The value of n must be between 1 and 127. ESC N is reset anytime the page length (ESC C) is changed.

Example:

```
      LPRINT CHR$ (27); "N"; CHR$ (6);
```

ESC O

Cancels skip-over perforation

The ESC O code cancels the skip perforation amount specified by ESC N.

ESC j

Reverse feed

Format: ESC j; n;
When this code is input, n/144 inch line spacing is executed in the reverse direction after the data in the print buffer has been printed out. n is in the range of 0 to 255.

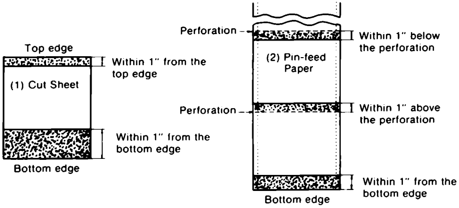
The set value of n will be cancelled by line feed.

Example:

```
LPRINT CHR$ (27); "j"; CHR$ (50);
```

NOTE: The reverse feed operation is not guaranteed when the Tractor Unit is in use.

Do not attempt reverse feed in the shaded areas in the figures below to avoid damage or paper jam in the printer.


Top edge
(1) Cut Sheet
Within 1" from the top edge
Within 1" from the bottom edge
Bottom edge
Perforation
(2) Pin-feed Paper
Within 1" below the perforation
Perforation
Within 1" above the perforation
Within 1" from the bottom edge
Bottom edge

NOTE: If DIP Switch 3-4 is ON, the paper feed will be in increments of 1/216".

6-6 FORMAT CONTROL

BS

Backspace

When this code is input, all the data stored in the print buffer is printed out and the next print start position returns to the left by one column.

In the Enlarged or Elongated modes, the print position is backspaced by two normal characters.

BS is not guaranteed when the print mode has been changed.

Example:

```
LPRINT CHR$ (8);
```

HT

Horizontal TAB

When this code is input, all the data stored in the print buffer is printed out and it carries out the horizontal TAB to the predetermined position set by ESC D code.

In the Enlarged or Elongated modes, input of an HT code executes the TAB in twice the width as that in Normal mode. When the power is turned ON, TAB is automatically set every 8 characters.

If no TAB positions have been set the HT code will be ignored.

Since the TAB set position is stored as an absolute position, this position will not change even if you change the print mode. Horizontal TAB will be cancelled upon input of ESC I.

Example:

```
LPRINT CHR$ (9);
```

VT

Vertical TAB

When this code is input, all the data stored in the print buffer is printed out and then rapid line feed is carried out to the predetermined vertical TAB position set by ESC B or ESC b.

If the vertical TAB position is not predetermined, this code functions the same as LF code.

This code cancels the Elongated mode set by the SO code. Even if one vertical TAB position is set, line feed will be performed to this position or to the top of form position.

Example:

```
LPRINT CHR$ (11);
```

FF

Form feed

When this code is input, all the data stored in the print buffer is printed out and then paper feed is carried out in accordance with the predetermined page length.

This code cancels the Elongated mode set by the SO code.

Example:

```
LPRINT CHR$ (12);
```

ESC /

VFU channel selection

Format: ESC /; n;
Input of this code causes the printer to execute subsequent vertical TABs in accordance with the format specified by the channel n of VFU.

n is in the range of 0 to 7.

Example:

```
LPRINT CHR$ (27); "/"; CHR$ (1);
```

ESC B

Set Vertical TABS

Format: ESC B; n1; n2; ..... nk; NUL;
Sets vertical tab stop positions. Up to 16 vertical tab stop positions are recognized by the printer.

The n's, in the format above indicate tab stop positions. Tab stop numbers must be received in ascending numerical order. The tab stop numbers will not become valid until the NUL code is input. Once vertical tab stops are established, they will be valid until new tab stops are specified. (If the printer is reset or powered off, set tab stops are cleared.) If no tab stop is set, the Vertical Tab command behaves as a Line Feed command. ESC B followed only by NUL will cancel tab stops. The form length must be set by the ESC C command prior to setting tabs.

Since the current line spacing multiplied by the number of lines is stored as an absolute value for the TAB stop position, the vertical TAB setting will be performed as it has been set by this code even if the amount of the line spacing is changed.

The maximum number of n is 254.

Example:

```
LPRINT CHR$ (27); "B"; CHR$ (10); CHR$ (20); .....
CHR$ (40); CHR$ (0);
```

ESC C

Form length setting by number of lines

Format: ESC C; n;
Sets the page length. The ESC C command must have a value following it to specify the length of page desired. (Maximum form length for the printer is 127 lines.)
The example below sets the page length to 72 lines.
The printer defaults to 66 lines per page when powered on or reset.

The form length will be stored as an absolute length with the amount of line spacing multiplied by the specified number of lines. Therefore, the specified form length will not change after it has been set even if the amount of line spacing is changed.

Example:

```
LPRINT CHR$ (27); "C"; CHR$ (72);
```

ESC C 0

Sets Form Length in Inches

Format: ESC C0; n

This command is used to set the form length per page in inches (1 to 22 inches).

ESC D

Set Horizontal TAB Stops

Format: ESC D; n1; n2; ..... nk; NUL;
Sets the horizontal tab stop positions. "n" denotes column position and the horizontal TAB position is stored as a value of the current character width multiplied by the specified number of lines.

The example below shows the horizontal tab positions set at printer column positions of 10, 20 and 40. They are followed by CHR$ (0), the NUL code. They must also be in ascending numerical order as shown. Tab stops can be set between 1 and 80 (132 on the D300). When the printer is in the Compressed print mode, tab stops can be set up to 132 (220 on the D300).
The maximum number of tabs that can be set is 32.

Example:

```
LPRINT CHR$ (27); "D"; CHR$ (10); CHR$ (20);
CHR$ (40); CHR$ (0);
```

ESC Q

Sets the Column Width

Format: ESC Q; n;

This command is used to set the right margin. The following shows the possible column width range in each mode.

FOR D-200		ELONGATION
Normal or Emphasized Mode	2≤n≤80	(1≤n≤40)
Elite Mode	3≤n≤96	(2≤n≤48)
Condensed Mode	4≤n≤133	(2≤n≤66)
NLQ Mode	2≤n≤80	(1≤n≤40)

FOR D-300		
Normal or Emphasized Mode	2≤n≤132	(1≤n≤66)
Elite Mode	3≤n≤158	(2≤n≤79)
Condensed Mode	4≤n≤220	(2≤n≤110)
NLQ Mode	2≤n≤132	(1≤n≤40)

ESC b

VFU position setting

Format: ESC b; n; m1; m2; ....; mk; NUL;
This code sets the VFU (Vertical Format Unit) position for channel n. For details of VFU, refer to ESC / code. The specified TAB positions must be terminated with CHR$ (0). The VFU has 8 channels 0 ≤ n ≤ 7, and for each channel, up to 16 (1 ≤ k ≤ 16) positions can be set within the page length.

Channel is set to 0 at power ON.

Example:

```
LPRINT CHR$ (27); "b"; CHR$ (1); CHR$ (10);
CHR$ (20); CHR$ (0);
```

ESC l

Left margin setting

Format: ESC l; n;
This code sets the left margin in the current character size. There is a maximum value for "n" in each character size and if the excess value for "n" is set, it will be ignored.

0 ≤ n ≤ 78 (130) Pica mode
0 ≤ n ≤ 129 (216) Condensed mode
0 ≤ n ≤ 39 (65) Enlarged pica mode
0 ≤ n ≤ 64 (108) Enlarged condensed mode
0 ≤ n ≤ 93 (155) Elite mode
0 ≤ n ≤ 46 (77) Enlarged elite mode

(*) means value for D-300

In proportional mode, the print column width is set in normal character size.

Input of the ESC l code causes the horizontal TAB positions previously set to be cleared and the subsequent horizontal TAB setting is carried out assuming the start column position set by the ESC l is position 0.

Example:

```
LPRINT CHR$ (27); "l"; CHR$ (20);
```

6-7 INPUT DATA CONTROL

CAN

Cancel

When this code is input, all the data previously stored in the print buffer on the same line is cancelled.

Example:

```
LPRINT CHR$ (24);
```

DC1

Selection of the printer

The DC1 code places the printer in the Selected state. It enables the printer to receive data.

With the printer in the Selected state, if the DC1 code is input during data transfer, all data stored before the DC1 code is ignored.

DC1 code is effective only when DIP switch 2-2 is OFF.

Example

```
LPRINT CHR$ (17);
```

DC3

Deselection of the printer

The DC3 code places the printer in the Deselected state. In other words, it disables the printer to receive data.

DC3 code is effective only when DIP switch 2-2 is OFF.

NOTE: When power is applied, if SLCT IN is at HIGH level or the DIP switch pin 2-2 is OFF, the printer is regarded as in the Deselected state.

Example:

```
LPRINT CHR$ (19);
```

DEL

Delete the last byte

The DEL code deletes the one character immediately preceding this code. When the printing font is designated as proportional or Italic, the command is ignored.

ESC 6

Printable Code Area Selection

This command is used to select 80 Hex to 9F Hex and 0FF Hex as a printable area.

In this selection, 80-9F Hex prints italic characters.

Dec	Hex. code	Character	Dec	Hex. code	Character	Dec	Hex. code	Character	Dec	Hex. code	Character
128	80	à	137	89	Ñ	145	91	β	153	99	Ü
129	81	é	138	8A	ñ	146	92	Æ	154	9A	ä
130	82	ù	139	8B		147	93	æ	155	9B	ö
131	83	ò	140	8C	₧	148	94	Ø	156	9C	ü
132	84	ì	141	8D	Â	149	95	ø	157	9D	É
133	85	°	142	8E	å	150	96	¨	158	9E	é
134	86	£	143	8F	ç	151	97	Ä	159	9F	÷
135	87	¡	144	90	§	152	98	Ö	255	FF	0
136	88	¿									

ESC 7 Control Code Area Selection

This command is used to select 80 Hex to 9F Hex and 0FF Hex as control codes.

No printing is performed in this mode.

Dec	Hex. code	Character	Dec	Hex. code	Character	Dec	Hex. code	Character	Dec	Hex. code	Character
128	80		137	89	HT	145	91		153	99	
129	81		138	8A	LF	146	92	DC2	154	9A	
130	82		139	8B	VT	147	93	DC3	155	9B	ESC
131	83		140	8C	FF	148	94	DC4	156	9C	
132	84		141	8D	CR	149	95		157	9D	
133	85		142	8E	SO	150	96		158	9E	
134	86		143	8F	SI	151	97		159	9F	
135	87		144	90		152	98	CAN	255	FF	
136	88	BS									

ESC = MSB = 0 setting

When this code is input, the MSB of an 8-bit data input after this code becomes 0. MSB control does not work for bit image data.

Example:

```
LPRINT CHR$ (27); "=";
```

ESC > MSB = 1 setting

When this code is input, the MSB of an 8-bit data input after this code becomes 1.

MSB control does not work for bit image data.

Example:

```
LPRINT CHR$ (27); " > ";
```

ESC # MSB control sequence cancel

This code cancels the MSB control set by ESC = or ESC > etc.

Example:

```
LPRINT CHR$ (27); "#";
```

ESC I Control code selection

You may print any of the international characters below directly by using ESC I; n

ESC + I + (1 or 49) selects printable characters
ESC + I + (0 or 48) selects control codes

International Character Table

Hex. code		Hex. code		Hex. code		Hex. code	
00	à	0D	CR	1A	ä	80	à
01	é	0E	SO	1B	ESC	81	è
02	ù	0F	SI	1C	ü	82	ù
03	ò	10	§	1D	É	83	ò
04	ì	11	ß	1E	é	84	ì
05	°	12	DC2	1F	¥	85	
06	£	13	DC3			86	£
07	BEL	14	DC4			87	
08	BS	15	ø			88	BS
09	HT	16	¨			89	HT
0A	LF	17	Ä			8A	LF
0B	VT	18	CAN			8B	VT
0C	FF	19	Ü			8C	FF

Hex. code		Hex. code	
8D	CR	9A	ä
8E	SO	9B	ESC
8F	SI	9C	ü
90	§	9D	É
91	ß	9E	é
92	DC2	9F	¥
93	DC3		
94	DC4		
95	ø		
96	¨		
97	Ä		
98	CAN		
99	Ü		

00 1F Hex is Normal Font.
80 9F Hex is Italic Font.

Example.

To print A

```
LPRINT CHR$ (27); "I"; CHR$ (1);
LPRINT CHR$ (23);
LPRINT CHR$ (27); "I"; CHR$ (0)
```

6-8 DOWNLOADABLE CHARACTERS

This feature allows you to design 96 of your own special characters. Each character uses a dot pattern of 8 vertical X 11 horizontal dots.

To use this feature you must

1. Use the Standard Control Set (Dip Switch 2-1 must be OFF)
2. Set Dip Switch 1-4 to OFF. This allows 1200 bytes of the input buffer to be used for storing your downloaded characters. This limits the input buffer to 800 bytes

ESC: 0 **Copies the character set from ROM to the RAM buffer**

This command copies the character set in use to the buffer. The designated national character set in use at the time of this command is copied.

Example:

```
LPRINT CHR$ (27); ":"; CHR$ (0); CHR$ (0); CHR$ (0);
```

ESC & **Defines downloadable character**

Format: CHR$ (27); "&"; CHR$ (0); CHR$ (n); CHR$ (m); CHR$ (a); CHR$ (P1); CHR$ (P2); ... CHR$ (P11);

n, m n and m are the starting and ending positions in the character code table in which you want to put your special characters. If you only want to put in one character then n = m. You may use any position from Hex 20 to Hex 7F.

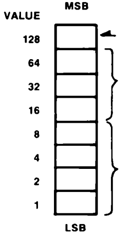
Examples:

1. If you wish to replace the @ with a special character, then n = m = @.
2. If you wish to replace A through E with 5 special characters, then n = A and m = E.

a a is the attribute character. It controls:

1. descenders
2. starting position of a character
3. stopping position of a character

ATTRIBUTE CHARACTER



DESCENDER CONTROL: If this Bit is ON, the special character will use the top 8 pins in the printhead. If it is OFF, the bottom 8 pins will be used.

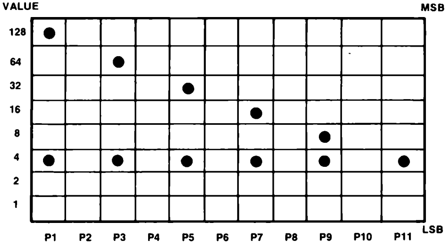
STARTING POSITION: We recommend that you always start in position P1. You may however, start in any of the first 7 positions.

STOPPING POSITION: We recommend you always stop in position P11. You may however, stop in any position as long as the character you define is at least 5 bytes (positions) long.

EXAMPLES: 1. To use the top 8 pins, stopping at position 11; a = 139 (128 + 8 + 2 + 1)
2. To use the bottom 8 pins, starting at position 2, stopping at position 7, a = 39 (32 + 4 + 2 + 1)

P1, P2 ... P11 For each position, the data is the sum of the values assigned to the pins you wish to activate.

DOWNLOAD CHARACTER MATRIX



To create the following character:

P1 = 132, P2 = 0, P3 = 68 ...

Example: To create the above character using the top 8 pins, placing it in position 7E Hex:

```
LPRINT CHR$ (27); "&"; CHR$ (0); "~~"; CHR$ (140); CHR$ (132);
CHR$ (0); CHR$ (68); CHR$ (0); CHR$ (36); CHR$ (0); CHR$ (20);
CHR$ (0); CHR$ (12); CHR$ (0); CHR$ (4);
```

ESC % 1 — **Selects download character set**

When this command is input, the downloaded character set previously defined, is selected.

Example:

```
LPRINT CHR$ (27); "%"; CHR$ (1); CHR$ (0);
```

ESC % 0 — **Selects internal character set**

When this command is input, the internal character set in ROM is used without affecting the downloaded area.

Example:

```
LPRINT CHR$ (27); "%"; CHR$ (0); CHR$ (0);
```

6-9 MISCELLANEOUS

CR — **Carriage return**

When this code is input, all the data stored in the print buffer is printed.

When $\overline{\text{AUTO FEED XT}}$ (Pin 14 of the interface connector) is at "LOW" level or when the DIP switch 2-4 is ON, (or the DIP switch 1-2 is OFF in IBM* Mode), the paper is advanced one line automatically after the execution of printing by CR code.

Input of the CR code with line feed will cancel enlarged mode set by SO code.

If no data precedes CR code, or if all preceding data is SPACE, the carriage assembly does not move.

Example:

```
LPRINT CHR$ (13);
```

ESC 8 — **Deselects the Paper-end Detector**

When this command is input, printing is continued down to the bottom end of a sheet, that is, the paper empty signal will be deactivated.

When DIP Switch 1-3 is ON, this mode is the default condition.

ESC 9 — **Selects the Paper-end Detector**

When this command is input, the paper end detector is active and ESC 8 mode is cancelled.

If DIP Switch 1-3 is OFF, this mode is the default condition.

ESC < — **Printing from left to right for one line**

When this code is input, the print head returns to its leftmost position and data is printed unidirectionally from left to right for one line.

Example:

```
LPRINT CHR$ (27); "<";
```

ESC @ — **Printer initialization**

When this code is input, the printer is intialized, causing all the data in the print buffer to be cleared.
This code does not affect the receiving buffer.

Example:

```
LPRINT CHR$ (27); "@";
```

ESC R **International character set selection**

Format: ESC R; n;
When the ESC R code is input, all data following this code is printed out in characters of the country specified by n.

The specified country character set will be valid until specified by any other ESC R code.

"n" represents one of the following country character sets.

n	Country	n	Country
0	U.S.A.	4	Spain
1	Germany	5	Holland
2	England	6	Canada
3	France	7	Swiss

As for the specific code tables and character fonts, refer to Table 3 at page 11.

Example:
LPRINT CHR$ (27); "R"; CHR$ (7);

ESC U **Unidirectional print**

Format: ESC U; n;
This code specifies whether or not printing should be performed unidirectionally.

n = 1 or 49 Unidirectional printing
n = 0 or 48 Bidirectional printing (except in Bit image mode and NLQ mode)

Example:
LPRINT CHR$ (27); "U"; CHR$ (0);

Self Test

Depressing the line feed switch while turning on the power places the machine in Self Test mode. The Self Test will print the rolling ASCII pattern continuously until the power switch is turned off.

Hex Dump

Depressing both the line feed and form feed switches while turning the power switch on places the unit in Hex Dump mode. In this mode all input data will be printed in Hex code.

7. IBM® CONTROL SET

If you wish to use the IBM® Control Set, set Dip Switch 2-1 to the ON position.

When Dip Switch 2-1 is ON, the functions controlled by Dip Switch 1 change and are shown in the table:

NOTE: Remember to turn the power OFF before changing switch settings.

7-1 IBM® CONTROL TABLES

Function of DIP Switch No. 1

Switch Pin No	Function	OFF	ON
1-1	Not Used	—	—
1-2	CR	CR & LF	CR
1-3	Buffer Full	CR & LF	CR
1-4	Cancel Code	Valid	Invalid
1-5	Line Spacing	1/6"	1/8"
1-6	Form Length	11"	12"
1-7	Character Generator	See Table 5	See Table 6
1-8	Not Used		—

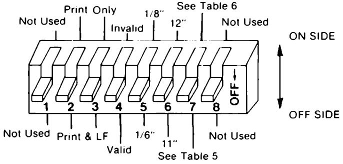


Table 5. Graphics Printer Character Set 1

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p	NUL		á	░	└	╨	α	≡
1		DC1	!	1	A	Q	a	q		DC1	í	▒	┴	╤	β	±
2		DC2	"	2	B	R	b	r		DC2	ó	▓	┬	╥	Γ	≥
3		DC3	#	3	C	S	c	s		DC3	ú	│	├	╙	Π	≤
4		DC4	$	4	D	T	d	t		DC4	ñ	┤	─	╘	Σ	⌠
5			%	5	E	U	e	u			Ñ	╡	┼	╒	σ	⌡
6			&	6	F	V	f	v			ª	╢	╞	╓	µ	÷
7			'	7	G	W	g	w			º	╖	╟	╫	τ	≈
8		CAN	(	8	H	X	h	x		CAN	¿	╕	╚	╪	Φ	°
9	HT		)	9	I	Y	i	y	HT		⌐	╣	╔	┘	Θ	▪
A	LF		*	:	J	Z	j	z	LF		¬	║	╩	┌	Ω	-
B	VT	ESC	+	;	K	[	k	{	VT	ESC	½	╗	╦	█	δ	√
C	FF		,	<	L	\	l	¦	FF		¼	╝	╠	▄	∞	ⁿ
D	CR		—	=	M	]	m	}	CR		¡	╜	═	▌	ø	²
E	SO		.	>	N	^	n	~	SO		«	╛	╬	▐	ε	■
F	SI		/	?	O	_	o		SI		»	┐	╧	▀	∩	SP

Table 6. Graphics Printer Character Set 2

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
1		DC1	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	β	±
2		DC2	"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
3	♥	DC3	#	3	C	S	c	s	â	ô	ú	│	├	╙	Π	≤
4	♦	DC4	$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
6	♠		&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
7			'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
8		CAN	(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
9	HT		)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	▪
A	LF		*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	-
B	VT	ESC	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
C	FF		,	<	L	\	l	¦	î	£	¼	╝	╠	▄	∞	ⁿ
D	CR		—	=	M	]	m	}	ì	¥	¡	╜	═	▌	ø	²
E	SO		.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	ε	■
F	SI		/	?	O	_	o		Å	ƒ	»	┐	╧	▀	∩	SP

PRINT MODE

NAME	CODE Dec.		CODE Hex.		Function	Ref. Page
SO	14		0E		Set Enlarged mode	16
SI	15		0F		Set Condensed mode	16
DC2	18		12		Cancels Condensed mode	16
DC4	20		14		Cancels Elongated mode	16
ESC —	27	45	1B	2D	Sets or cancels Underlined mode	17
ESC E	27	69	1B	45	Sets Emphasized mode	17
ESC F	27	70	1B	46	Cancels Emphasized mode	17
ESC G	27	71	1B	47	Sets Double-Strike mode	17
ESC H	27	72	1B	48	Cancels Double-Strike mode	18
ESC P	27	80	1B	50	Selects Normal (Pica sized) mode	18
ESC S 0	27	83 0	1B	53 00	Sets Superscript/Superscript mode	18
ESC S 1	27	83 1	1B	53 01	Sets Subscript mode	18
ESC T	27	84	1B	54	Cancels Subscript or Subscript mode	18
ESC W	27	87	1B	57	Sets or Cancels Double width	18

BIT IMAGE

NAME	CODE Dec.		CODE Hex.		Function	Ref. Page
ESC K	27	75	1B	4B	Sets Normal-density bit image mode (60 DPI)	19
ESC L	27	76	1B	4C	Sets Dual-density bit image mode (120 DPI)	20
ESC Y	27	89	1B	59	Sets the Double-speed, dual-density bit image mode (120 DPI)	20
ESC Z	27	90	1B	5A	Sets Quadruple-density bit image mode (240 DPI)	20

LINE SPACING

NAME	CODE Dec.		CODE Hex.		Function	Ref. Page
ESC 0	27	48	1B	30	Sets line spacing to 1/8 inch	30
ESC 1	27	49	1B	31	Sets line spacing to 7/72 inch	30
ESC 2	27	50	1B	32	Starts variable line feed	30
ESC 3	27	51	1B	33	Sets line spacing to n/144, n/216 inch	30
ESC A	27	65	1B	41	Sets line spacing to n/72 inch	30

PAPER FEED EXECUTION

NAME	CODE Dec.		CODE Hex.		Function	Ref. Page
LF	10		0A		Line Feed	21
ESC J	27	74	1B	4A	Feed paper m/144, n/216 inch	21
ESC N	27	78	1B	4E	Sets skip-over Perforation	21
ESC O	27	79	1B	4F	Cancels skip-over Perforation set	21

FORMAT CONTROL

NAME	CODE Dec.		CODE Hex.		Function	Ref. Page
HT	9		09		Horizontal TAB	31
VT	11		0B		Vertical TAB	31
FF	12		0C		Form Feed	22
ESC C	27	67	1B	43	Sets line per page	23
ESC C 0	27	67 0	1B	43 0	Sets form length in inches	23
ESC D	27	68	1B	44	Sets Horizontal Tab	23

INPUT DATA CONTROL

NAME	CODE Dec.		CODE Hex.		Function	Ref. Page
CAN	24		18		Cancels all the data stored in the print buffer.	24
DC1	17		11		Selects the printer	24
DC3	19		13		Deselects the printer	24
ESC 6	27	54	1B	36	Selects Character Set 2	32
ESC 7	27	55	1B	37	Selects Character Set 1	32

MISCELLANEOUS

NAME	CODE				Function	Ref. Page
	Dec.		Hex.			
CR	13		0D		Carriage Return.	27
ESC 8	27	56	1B	38	Deselects the paper-end detector.	27
ESC 9	27	57	1B	39	Selects the paper-end detector.	27
ESC U	27	85	1B	55	Starts or ends undirectional printing.	28

NON-COMMAND SEQUENCE

Operation	Function	Ref. Page
Power ON while holding LF	SELF-TEST	28
Power ON while holding down LF and FF	HEX. DUMP	28

7-2 LINE SPACING

ESC 0 **1/8 Inch Line Spacing**

Input of the ESC 0 code causes the subsequent line spacing to be set at 1/8 inch.

ESC 1 **7/72 Inch Line Spacing**

Input of the ESC 1 code causes the subsequent line spacing to be set at 7/72".

ESC 2 **Start Variable Line Feed**

The ESC 2 code performs line feeds in the amount of n/72" which has been set by the ESC A code.

If no ESC A code has been sent to the printer, the line feed performed by the ESC 2 is 1/6".

Example: `LPRINT CHR$ (27); "2";`

ESC 3 **n/144 Inch line spacing**

Format: ESC 3; n;
This code sets the amount of line spacing in units of 1/2 dot.

Input of the ESC 3 n code causes the subsequent line spacing to be set at n/144 inch.

The example below sets the paper feeding to 18/144 (1/8) inch. The value of n must be between 1 and 255.

Example:

```
10  'n/144 Inch Line Spacing
20  LPRINT CHR$ (27); "3"; CHR$ (18);
30  FOR X = 1 TO 4
40  LPRINT "18/144 Inch Line Spacing"
50  NEXT
```

NOTE: If Dip Switch 3-4 is ON, then this code will set line spacing in units of 1/3 dot or 1/216".

ESC A **Line space setting**

Format: ESC A; n;
This code sets the amount of line spacing to n/72 inch. The example below tells the printer to set line feeding to 9/72 inch. The value of n must be between 1 and 85.

The ESC A is input, the specified amount of line spacing will remain unchanged until the new line spacing is set.
This line spacing is effective after receiving ESC 2.

Example:

```
    LPRINT CHR$ (27); "A"; CHR$ (9);
```

7-3 FORMAT CONTROL

HT **Horizontal Tab**

When the printer is first turned on, tab stops are preset to every eight columns. An HT code will move the printhead to the next tab position. If there is no tab position to the right of the current printhead position, the HT code will be ignored.

Tab set positions are relative positions and will change if the print mode is changed. Tabs may be set by using the ESC D code.

VT **Vertical Tab**

The input of the VT code will be regarded as a LF (line feed) code.

ESC 6 **Select Character Set 2**

This code designates Character Set 2, Table 6 on page 29.

ESC 7 **Select Character Set 1**

This code designates Character Set 1, Table 5 on page 29.

APPENDIX A

Characters Sets Normal

Code		Char.	Code		Char.	Code		Char.
Dec.	Hex.		Dec.	Hex.		Dec.	Hex.	
32	20	(Space)	64	40	@	96	60	
33	21	!	65	41	A	97	61	a
34	22	"	66	42	B	98	62	b
35	23	#	67	43	C	99	63	c
36	24	$	68	44	D	100	64	d
37	25	%	69	45	E	101	65	e
38	26	&	70	46	F	102	66	f
39	27	'	71	47	G	103	67	g
40	28	(	72	48	H	104	68	h
41	29	)	73	49	I	105	69	i
42	2A	*	74	4A	J	106	6A	j
43	2B	+	75	4B	K	107	6B	k
44	2C	,	76	4C	L	108	6C	l
45	2D	—	77	4D	M	109	6D	m
46	2E	.	78	4E	N	110	6E	n
47	2F	/	79	4F	O	111	6F	o
48	30	0	80	50	P	112	70	p
49	31	1	81	51	Q	113	71	q
50	32	2	82	52	R	114	72	r
51	33	3	83	53	S	115	73	s
52	34	4	84	54	T	116	74	t
53	35	5	85	55	U	117	75	u
54	36	6	86	56	V	118	76	v
55	37	7	87	57	W	119	77	w
56	38	8	88	58	X	120	78	x
57	39	9	89	59	Y	121	79	y
58	3A	:	90	5A	Z	122	7A	z
59	3B	;	91	5B	[	123	7B	{
60	3C	<	92	5C	\	124	7C	|
61	3D	=	93	5D	]	125	7D	}
62	3E	>	94	5E	^	126	7E	—
63	3F	?	95	5F	_			

Characters Sets Italic

Code		Char	Code		Char	Code		Char.
Dec	Hex.		Dec	Hex.		Dec	Hex.	
160	A0	(Space)	192	C0	@	224	E0	`
161	A1	!	193	C1	A	225	E1	a
162	A2	"	194	C2	B	226	E2	b
163	A3	#	195	C3	C	227	E3	c
164	A4	$	196	C4	D	228	E4	d
165	A5	%	197	C5	E	229	E5	e
166	A6	&	198	C6	F	230	E6	f
167	A7	'	199	C7	G	231	E7	g
168	A8	(	200	C8	H	232	E8	h
169	A9	)	201	C9	I	233	E9	i
170	AA	*	202	CA	J	234	EA	j
171	AB	+	203	CB	K	235	EB	k
172	AC	,	204	CC	L	236	EC	l
173	AD	—	205	CD	M	237	ED	m
174	AE		206	CE	N	238	EE	n
175	AF	/	207	CF	O	239	EF	o
176	B0	0	208	D0	P	240	F0	p
177	B1	1	209	D1	Q	241	F1	q
178	B2	2	210	D2	R	242	F2	r
179	B3	3	211	D3	S	243	F3	s
180	B4	4	212	D4	T	244	F4	t
181	B5	5	213	D5	U	245	F5	u
182	B6	6	214	D6	V	246	F6	v
183	B7	7	215	D7	W	247	F7	w
184	B8	8	216	D8	X	248	F8	x
185	B9	9	217	D9	Y	249	F9	y
186	BA	:	218	DA	Z	250	FA	z
187	BB	;	219	DB	[	251	FB	{
188	BC	<	220	DC	\	252	FC	|
189	BD	=	221	DD	]	253	FD	}
190	BE	>	222	DE	^	254	FE	-
191	BF	?	223	DF	_	255	FF	

▨ The shaded areas indicate characters which are subject to national variation. These are listed at page 11.

APPENDIX B

1. Normal Font

Proportional Spacing

ASCII Code		Char.	Width (Unit: 1/2 dot)	ASCII code		Char.	Width (Unit: 1/2 dot)
Dec.	Hex.			Dec.	Hex.		
32	20	SPACE	12	80	50	P	12
33	21	!	5	81	51	Q	12
34	22	"	8	82	52	R	10
35	23	#	12	83	53	S	12
36	24	$	12	84	54	T	12
37	25	%	12	85	55	U	12
38	26	&	12	86	56	V	12
39	27	'	8	87	57	W	12
40	28	(	6	88	58	X	10
41	29	)	6	89	59	Y	12
42	2A	*	12	90	5A	Z	10
43	2B	+	12	91	5B	[	8
44	2C		8	92	5C	\	10
45	2D		12	93	5D	]	8
46	2E	.	8	94	5E	^	10
47	2F	/	10	95	5F	—	12
48	30	0	12	96	60	`	8
49	31	1	12	97	61	a	12
50	32	2	12	98	62	b	10
51	33	3	12	99	63	c	10
52	34	4	12	100	64	d	10
53	35	5	12	101	65	e	12
54	36	6	12	102	66	f	10
55	37	7	12	103	67	g	12
56	38	8	12	104	68	h	10
57	39	9	12	105	69	i	8
58	3A		6	106	6A	j	10
59	3B	;	6	107	6B	k	10
60	3C	<	10	108	6C	l	8
61	3D	=	12	109	6D	m	12
62	3E	>	10	110	6E	n	12
63	3F	?	10	111	6F	o	12
64	40	@	12	112	70	p	10
65	41	A	12	113	71	q	12
66	42	B	12	114	72	r	12
67	43	C	10	115	73	s	12
68	44	D	12	116	74	t	10
69	45	E	12	117	75	u	12
70	46	F	12	118	76	v	12
71	47	G	12	119	77	w	12
72	48	H	12	120	78	x	12
73	49	I	8	121	79	y	12
74	4A	J	12	122	7A	z	10
75	4B	K	12	123	7B	{	6
76	4C	L	12	124	7C	:	5
77	4D	M	12	125	7D	}	6
78	4E	N	12	126	7E	~	12
79	4F	O	12	127	7F		

APPENDIX C

2. NLQ Font

Proportional Spacing

ASCII Code		Char.	Width (Unit: 1/2 dot)	ASCII Code		Char.	Width (Unit: 1/2 dot)
Dec.	Hex.			Dec.	Hex.		
32	20	SPACE	20	80	50	P	20
33	21	!	8	81	51	Q	18
34	22	"	10	82	52	R	20
35	23	#	14	83	53	S	18
36	24	$	14	84	54	T	20
37	25	%	20	85	55	U	18
38	26	&	18	86	56	V	20
39	27	'	8	87	57	W	20
40	28	(	10	88	58	X	20
41	29	)	10	89	59	Y	18
42	2A	*	18	90	5A	Z	18
43	2B	+	16	91	5B	[	10
44	2C	,	8	92	5C	\	10
45	2D	-	16	93	5D	]	10
46	2E	.	8	94	5E	^	16
47	2F	/	10	95	5F	—	18
48	30	0	16	96	60	`	8
49	31	1	16	97	61	a	18
50	32	2	16	98	62	b	18
51	33	3	16	99	63	c	16
52	34	4	16	100	64	d	18
53	35	5	16	101	65	e	16
54	36	6	16	102	66	f	16
55	37	7	16	103	67	g	16
56	38	8	16	104	68	h	20
57	39	9	16	105	69	i	12
58	3A	:	8	106	6A	j	14
59	3B	;	8	107	6B	k	18
60	3C	<	16	108	6C	l	12
61	3D	=	14	109	6D	m	20
62	3E	>	16	110	6E	n	20
63	3F	?	14	111	6F	o	16
64	40	@	20	112	70	p	18
65	41	A	20	113	71	q	18
66	42	B	20	114	72	r	14
67	43	C	18	115	73	s	14
68	44	D	20	116	74	t	14
69	45	E	20	117	75	u	20
70	46	F	20	118	76	v	20
71	47	G	20	119	77	w	20
72	48	H	20	120	78	x	20
73	49	I	10	121	79	y	20
74	4A	J	20	122	7A	z	14
75	4B	K	20	123	7B	{	12
76	4C	L	81	124	7C	:	8
77	4D	M	20	125	7D	}	12
78	4E	N	20	126	7E	~	18
79	4F	O	18	127	7F		

APPENDIX D

ASCII TABLE

Dec.	Hex.	ASCII	Dec.	Hex.	ASCII	Dec.	Hex.	ASCII
00	00	NUL	46	2E	.	92	5C	/
01	01	SOH	47	2F	/	93	5D	]
02	02	STX	48	30	0	94	5E	^
03	03	ETX	49	31	1	95	5F	—
04	04	EOT	50	32	2	96	60	`
05	05	ENQ	51	33	3	97	61	a
06	06	ACK	52	34	4	98	62	b
07	07	BEL	53	35	5	99	63	c
08	08	BS	54	36	6	100	64	d
09	09	HT	55	37	7	101	65	e
10	0A	LF	56	38	8	102	66	f
11	0B	VT	57	39	9	103	67	g
12	0C	FF	58	3A	:	104	68	h
13	0D	CR	59	3B	;	105	69	i
14	0E	SO	60	3C	<	106	6A	j
15	0F	SI	61	3D	=	107	6B	k
16	10	DLE	62	3E	>	108	6C	l
17	11	DC1	63	3F	?	109	6D	m
18	12	DC2	64	40	@	110	6E	n
19	13	DC3	65	41	A	111	6F	o
20	14	DC4	66	42	B	112	70	p
21	15	NAK	67	43	C	113	71	q
22	16	SYN	68	44	D	114	72	r
23	17	ETB	69	45	E	115	73	s
24	18	CAN	70	46	F	116	74	t
25	19	EM	71	47	G	117	75	u
26	1A	SUB	72	48	H	118	76	v
27	1B	ESC	73	49	I	119	77	w
28	1C	FS	74	4A	J	120	78	x
29	1D	GS	75	4B	K	121	79	Y
30	1E	RS	76	4C	L	122	7A	z
31	1F	US	77	4D	M	123	7B	{
32	20	SP	78	4E	N	124	7C	¦
33	21	!	79	4F	O	125	7D	}
34	22	"	80	50	P	126	7E	~
35	23	# or £	81	51	Q	127	7F	DEL
36	24	$	82	52	R			
37	25	%	83	53	S			
38	26	&	84	54	T			
39	27	'	85	55	U			
40	28	(	86	56	V			
41	29	)	87	57	W			
42	2A	*	88	58	X			
43	2B	+	89	59	Y			
44	2C	,	90	5A	Z			
45	2D	-	91	5B	[			

APPENDIX E: CONTROL CODE APPLICABILITY

PRINT MODE

NAME	CODE		DIP SWITCH 2-1	
	Dec.	Hex.	OFF	ON
SO	14	0E	X	X
SI	15	0F	X	X
DC2	18	12	X	X
DC4	20	14	X	X
ESC SO	27 14	1B 0E	X	
ESC SI	27 15	1B 0F	X	
ESC 4	27 52	1B 34	X	
ESC 5	27 53	1B 35	X	
ESC !	27 33	1B 21	X	
ESC -	27 45	1B 2D	X	X
ESC E	27 69	1B 45	X	X
ESC F	27 70	1B 46	X	X
ESC G	27 71	1B 47	X	X
ESC H	27 72	1B 48	X	X
ESC M	27 77	1B 4D	X	
ESC P	27 80	1B 50	X	X
ESC S 0	27 83 0	1B 53 00	X	X
ESC S 1	27 83 1	1B 53 01	X	X
ESC T	27 84	1B 54	X	X
ESC W	27 87	1B 57	X	X
ESC p	27 112	1B 70	X	
ESC ;	27 59	1B 3B	X	

BIT IMAGE

NAME	CODE		DIP SWITCH 2-1	
	Dec.	Hex.	OFF	ON
ESC *	27 42	1B 2A	X	
ESC K	27 75	1B 4B	X	X
ESC L	27 76	1B 4C	X	X
ESC Y	27 89	1B 59	X	X
ESC Z	27 90	1B 5A	X	X

LINE SPACING

NAME	CODE		DIP SWITCH 2-1	
	Dec.	Hex.	OFF	ON
ESC 0	27 48	1B 30	X	X
ESC 1	27 49	1B 32	X	X
ESC 2	27 50	1B 32	X	X
ESC 3	27 51	1B 33	X	X
ESC A	27 65	1B 41	X	X

NAME	CODE		DIP SWITCH 2-1	
	Dec.	Hex.	OFF	ON
LF	10	0A	X	X
ESC J	27 74	1B 4A	X	X
ESC N	27 78	1B 4E	X	X
ESC O	27 79	1B 4F	X	X
ESC j	27 106	1B 6A	X	

FORMAT CONTROL

NAME	CODE		DIP SWITCH 2-1	
	Dec.	Hex.	OFF	ON
BS	8	08	X	
HT	9	09	X	X
VT	11	0B	X	X
FF	12	0C	X	X
ESC /	27 47	1B 2F	X	
ESC B	27 66	1B 42	X	
ESC C	27 67	1B 43	X	X
ESC C 0	27 67 0	1B 43 00	X	X
ESC D	27 68	1B 44	X	X
ESC Q	27 81	1B 51	X	
ESC b	27 98	1B 62	X	
ESC l	27 108	1B 6C	X	

INPUT DATA CONTROL

NAME	CODE		DIP SWITCH 2-1	
	Dec.	Hex.	OFF	ON
CAN	24	18	X	X
DC1	17	11	X	X
DC3	19	13	X	X
DEL	16	10	X	
ESC 6	27 54	1B 36	X	X
ESC 7	27 55	1B 37	X	X

INPUT DATA CONTROL

NAME	CODE		DIP SWITCH 2-1	
	Dec.	Hex.	OFF	ON
ESC =	27 61	1B 3D	X	
ESC >	27 62	1B 3E	X	
ESC #	27 35	1B 23	X	
ESC I	27 73	1B 49	X	

DOWNLOAD CHARACTER

NAME	CODE		DIP SWITCH 2-1	
	Dec.	Hex.	OFF	ON
ESC &	27 38	1B 26	X	
ESC % 0	27 37 0	1B 25 00	X	
ESC % 1	27 37 1	1B 25 01	X	
ESC : 0	27 58 0	1B 3A 00	X	

MISCELLANEOUS

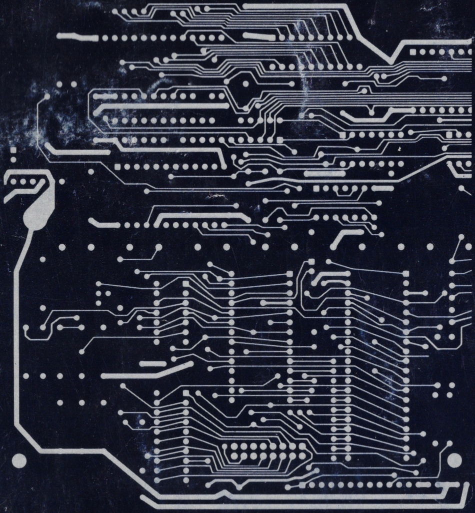
NAME	CODE		DIP SWITCH 2-1	
	Dec.	Hex.	OFF	ON
CR	13	0D	X	X
ESC 8	27 56	1B 38	X	X
ESC 9	27 57	1B 39	X	X
ESC <	27 60	1B 3C	X	
ESC @	27 64	1B 40	X	
ESC R	27 82	1B 52	X	
ESC U	27 85	1B 55	X	X

NON-COMMAND SEQUENCE

Operation	DIP SWITCH 2-1	
	OFF	ON
Power ON while holding LF	X	X
Power ON while holding down LF and FF	X	X

CONTROL CODE SET

Operation	DIP SWITCH 2-1	
	OFF	ON
Standard	X	
IBM*		X



LIMITED WARRANTY

SCM Corporation warrants this Dot Matrix Printer to be free from defects in materials and workmanship at the time of delivery. If it need repair due to such defect during the first year from the date of purchase, return it to the dealer from whom it was purchased or to one of the Smith-Corona Authorized Service Centers. The Dot Matrix Printer must be accompanied by proof of purchase including date of sale and serial number. SCM'S SOLE RESPONSIBILITY SHALL BE TO REPAIR OR REPLACE, AT ITS OPTION THE DOT MATRIX PRINTER.

GENERAL PROVISIONS

This warranty does not cover damage resulting from accident, neglect, misuse or abuse, any modification or alteration including attaching the unit to other than the recommended receptacle or voltage, nor does it cover ribbon replacement or cleaning.

THIS WARRANTY IS VOID WHEN SERVICE OR REPAIRS ARE PERFORMED BY A SERVICE FACILITY NOT AUTHORIZED BY SMITH-CORONA. The warranty does not cover shipping expenses to or from a service location.

NO RESPONSIBILITY IS ASSUMED FOR ANY SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING LOSS OF PROFITS.

To obtain the address or service location nearest you simply call toll free

800-448-1018*

(In New York State, call 800-962-3000)

The toll-free numbers operate Monday through Friday, from 8:00 am to 6:00 pm on Eastern Time.

*Does not apply in Alaska or Hawaii.

NOTE: No other warranty, written or verbal, is authorized by SCM Corporation.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state. Some states do not allow the exclusion or limitation of consequential damages so the above exclusion and limitations may not apply to you.

Smith-Corona
Consumer Affairs
P. O. Box 4819
Syracuse, NY 13221

This Warranty applies only in the U.S.A.

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